

Technical Overview

The **RE-PR3-E-xx** are a range Thyristor control assemblies that provides full seamless control of 3-phase resistive loads of up to 36 & 54kW, using two thirds control technique. They are controlled by a 0-5Vdc, 0-10Vdc signal or manual 5K Ω pot.

This burst fire control assemblies use fast pulse, zero volt, switching technology to minimise flicker and eliminate RFI problems.

They also incorporate a temperature trip, automatic reset, alarm output, LED 'output on' indication and heatsink. Applications include electric heater batteries and dust heaters.

Features

- 0-5Vdc, 0-10Vdc or manual 5K Ω pot control input
- Over temperature protection with auto reset
- No additional heatsinks required



Specification

Input signal 0-5Vdc, 0-10Vdc or manual 5K Ω pot
Supply (control) 24Vac/dc $\pm 10\%$ (by dipswitch)
Supply (load) 3-Phase 400V RMS $\pm 10\%$ 50/60Hz

Power /current ratings:

RE-PR3-E-36 36kW (50A per phase)

RE-PR3-E-54 54kW (75A per phase)

Fusing:

RE-PR3-E-36 56A H/S semiconductor (integral)

RE-PR3-E-54 80A H/S semiconductor (integral)

Terminal connections:

Auxiliary alarm Rising cage for 2.5mm² cable max.

Control Rising cage for 2.5mm² cable max.

Power:

RE-PR3-E-36 Rising cage for 10mm² cable max.

RE-PR3-E-54 Rising cage for 16mm² cable max.

Terminal torque settings:

RE-PR3-E-36 2Nm (power terminals only)

RE-PR3-E-54 2.5Nm (power terminals only)

Over temperature:

Trip in temp. @ 90°C $\pm 1^\circ\text{C}$

Trip out temp. @ 85°C $\pm 1^\circ\text{C}$

Fault condition Relay rated at 230Vac @ 8A

Fault status:

Phase loss LED flashes in 1.5 sec. pulse bursts

Sensor loss LED flashes in 0.5 sec. pulse bursts

Ambient temperature 65°C (maximum operational)

Dimensions (L, W, H):

RE-PR3-E-36 205 x 155 x 120mm

RE-PR3-E-54 250 x 155 x 120mm

Conformity CE Marked

Country of origin UK

Product Codes

RE-PR3-E-36

Panel mount 3-phase 36kW electric heater controller

RE-PR3-E-54

Panel mount 3-phase 54kW electric heater controller

SAFETY REQUIREMENTS & ADVICE SHEET

Introduction

The objective of this leaflet is to provide information to ensure that the safety of the person(s) installing or maintaining the equipment is not compromised and its location and method of installation does not endanger others, either during or after installation.

Customers should be aware of the Health and Safety at Work Act 1974 (HSW 1974) and the EC "Provision and Use of Work Equipment Regulations 1992" (PUWER). Both are available from the Health and Safety Executive (HSE) publications, within the UK.

Installation

CE Directives

These are European regulations which apply to our industry. They affect the equipment emissions and immunity to Radio Frequency Interference (RFI) and various elements of safety for electrical equipment.

The European Community 'CE' Directives that mainly concern *Sontay Ltd* are, the Low Voltage Directive (**LVD**) and the Electromagnetic Compliance Directive (**EMC**).

A Declaration of Conformity may be supplied with the product or supplied on request.

Torque Settings

Good working practises must be adhered to ensuring appropriate electrical and mechanical installation. This would include the mechanical fixing of potentiometer bushes and electrical set screw and/or pillar connections. These Electrical Connections and Mechanical Fastenings must not be over tightened. We would recommend a typical torque setting of 1 to 5Nm. For specific product information, see appropriate product data sheet, where applicable.

Cooling Requirements

The use of an additional heatsink (this could be a conductive panel) suitably attached or mounted with the unit, will help to dissipate heat away from the device(s). An alternative or additional method would be forced air-cooling (using a fan), to assist the natural convection of airflow over an existing heatsink within the unit. The product fins should be mounted in line with the forced and/or natural airflow.

The equipment's environment and its initial ambient temperature also need to be considered, as this could have an adverse effect on the overall operating conditions.

Fusing

We recommend that semiconductor, fast acting to BS88 IEC 269, type fuses or circuit breakers (Semiconductor - MCB) should be used for unit and/or device protection. The appropriate maximum load current should be known to select the required SCR fuse or MCB, but must not exceed the equipment rating. The $I^2 t$ ($A^2 s$) rating of the selected fuse must be less than that of the equipment so as to protect the equipment's discrete device. Further appropriate fusing may be required for protection of the unit supply using standard fuse links and holders. Failure to address these requirements and the use of incorrectly selected fuses may cause the equipment to fail.

Earthing

The protective conductor terminal of the equipment must be utilised at all times and bonded to a 'good' Earth (ground). The earth bonding (strapping) leads of any combined equipment should be as short as possible and be substantial, i.e. at least rated higher than the equipment's load. For further information, refer to BS7671. Following these simple guidelines will ensure optimum use of any appropriate filter circuits which may be required.

Insulation (over-voltage category) and Protection from electric shock Classification of Equipment

All equipment, unless otherwise stated, is rated to CLASS II Insulation (Over-voltage category) and CLASS I (Protection category).

Maintenance

Before any servicing is carried out, reference should be made to appropriate installation instructions, drawings and labelling which may come with the equipment. Personnel should switch off the unit supply before accessing or removing any safety cover and be aware of hazardous live parts.

Location & ventilation

The **RE-PR3-E-xx** power controllers are designed for mounting on a vertical panel, with the heatsink fins to the bottom. It is important that free air movement around the heatsink is not restricted. Allow sufficient air space between adjacent units to allow optimum performance of the heatsink. The maximum ambient of 65°C should not be exceeded. Where necessary control panels & enclosures should be ventilated with a fan.

Load considerations

The **RE-PR3-E-xx** series of power controllers are designed for resistive type loads only. Capacitive, or unusual heating loads such as Molybdenum, Platinum or Tungsten, (which can have a 10:1 hot to cold resistance ratio) are not suitable.

Over temperature monitoring

The **RE-PR3-E-xx** are fitted with a thermal protection device to protect against over temperature. The unit will automatically switch off the load in the event of the heatsink temperature exceeding safe limits (90°C ±1°C). Once the temperature has fallen to a safe level (85°C ±1°C) the load will be switched on again if the supply is still present.

Under normal operating conditions the heatsink will not reach 90°C but this might occur, for example when the ambient temperature exceeds 65°C.

Caution: During the course of normal operation metal parts, in particular the heatsink, may get very hot.

Control supply

The **RE-PR3-E-36** and **RE-PR3-E-54** are factory set for an internal 24V power supply.

If using an external 24Vac/dc supply you must change the DIP switch SW4 on the PCB **prior to applying power**. This is polarity independent.

Important! The external 24Vac/dc supply **MUST NOT** be commonly linked to the control 0V signal terminal. Failure to comply with this may result in the on board transformer overheating, the 1A fuses blowing and damage to the bridge rectifier.

If there is a requirement for the alarm relay and LED to energise when any of the 3 phases fails, the external, isolated 24Vac/dc supply option must be used.

Earth connection

The RE **MUST** be earthed. A protective earth connection is provided in the main terminal connections.

Back-up protection and load supply

The **RE-PR3-E-xx** are protected by internal quick acting semiconductor type fuses.

Load cables must be sized such that they are rated in excess of the fuse ratings.

It is recommended that a load break switch and a break contactor is installed in the load supply. The supply to the contactor coil should be interrupted by an over-temperature thermostat located in the heater battery and also upon detection of airflow loss.

Fault conditions

The factory default setting of DIP switch **SW1** is the ON position. In this position, the alarm relay will be **energised only when a fault condition occurs**.

Changing SW1 to the OFF position will cause the alarm relay to be **energised continuously until a fault condition occurs**.

If the internal 24V supply is used, a fault condition will occur on over temperature or if the **L1** phase **only** is missing. If an external 24V supply is used, a fault condition will occur on over temperature, temperature sensor failure, or if **any** of the 3 phases are missing.

Should the 24V supply fail the output of the unit will fail to OFF with no output.

Phase loss with auxiliary supply

When **any** one of the three phase inputs are missing, the relay changes state and the LED flashes ON/OFF bursts of 1.5 seconds.

Note - This is only true when using an **external** 24V supply.

Alarm relay

The alarm relay has contacts rated up to 8A @ 230Vac (RMS) load. Where the internal 24V supply is used, the relay obtains its supply from the transformer via two 20mm 1A fuses, and are connected to the **L2** and **L3** phases. Therefore the alarm relay can only change state when there is an over-temperature condition, a sensor fault, or if the **L1** phase only is missing.

Manual control

The units output can be controlled manually by using a 5kΩ linear potentiometer connected as shown on page 4, **with the input signal set to 5Vdc (SW4)**.

Note: A 5kΩ linear potentiometer **MUST NOT** be connected at same time as an external control signal.

Installation

1. The **RE-PR3-E-xx** should only be installed by a competent, suitably trained technician, experienced in installation with hazardous voltages. (>50Vac & <1000Vac or >75Vdc & 1500Vdc)
2. Ensure that all power is disconnected before carrying out any work on the **RE-PR3-E-xx**.
3. Maximum cable is 2.5mm² for control supply and 10mm² for phase power. Care must be taken not to over tighten terminals.

Connections

Dip Switches

SW1 (relay status):

ON = Standard

OFF = Reverse

SW3 (control signal):

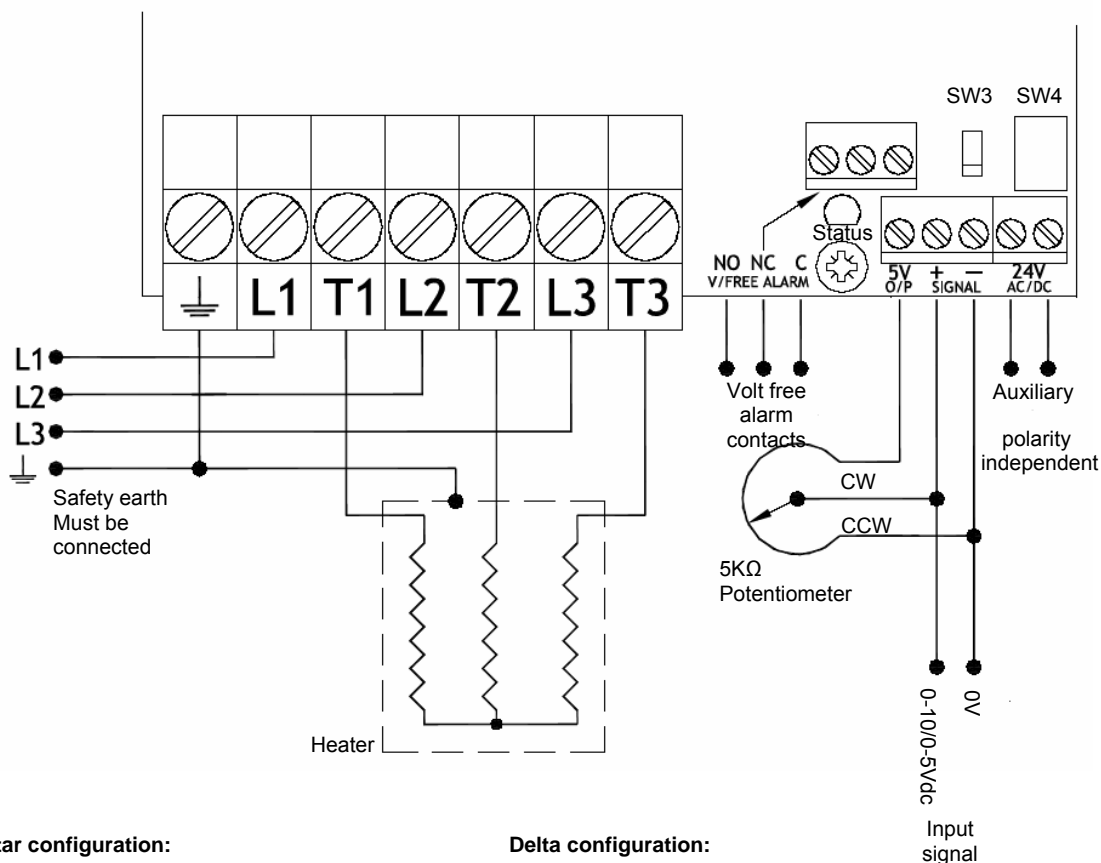
ON = 0-10Vdc signal

OFF = 0-5Vdc signal

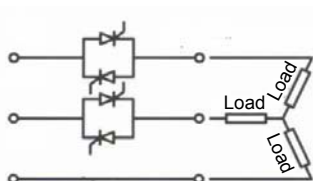
SW4 (remote supply):

INT = Uses internal transformer

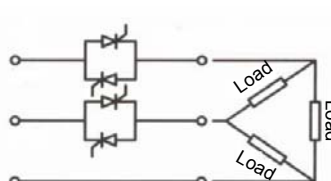
EXT = External 24V supply



Star configuration:



Delta configuration:



WARNING! Do not connect neutral to star point of heater.